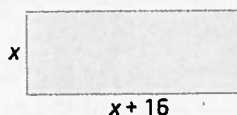


For help with question 3, see Example 2.

3. The length of a rectangle is 16 cm greater than its width. The area is 35 m^2 . Find the dimensions of the rectangle, to the nearest hundredth of a metre.

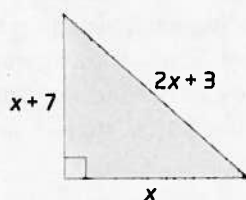


For help with questions 4 and 5, see Example 3.

4. The product of two consecutive numbers is 3306. What are the numbers?
5. Determine two consecutive odd integers whose product is 323.

For help with question 6, see Example 4.

6. The length of one leg of a right triangle is 7 cm more than that of the other leg. The length of the hypotenuse is 3 cm more than double that of the shorter leg. Find the lengths of each of the three sides.



For help with question 7, see Example 5.

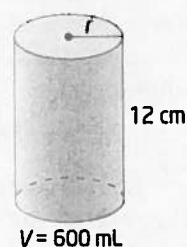
7. **Use Technology** Measurements from the flight path of a tennis ball are recorded.

| Horizontal Distance (m) | 6 | 8 | 10 | 12 | 14 |
|-------------------------|-----|-----|-----|-----|-----|
| Height (m) | 4.4 | 4.9 | 5.0 | 4.7 | 4.0 |

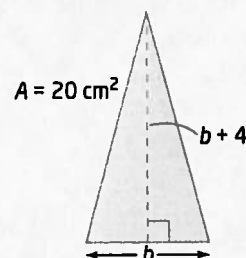
- a) Use a graphing calculator or a spreadsheet to create a scatter plot of the data and add a curve of best fit.
- b) Determine the equation of the quadratic relation.

Connect and Apply

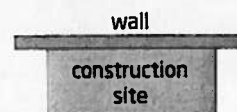
8. A cylindrical can with height 12 cm has capacity 600 mL. What is its radius, to the nearest millimetre? [Remember that $1 \text{ mL} = 1 \text{ cm}^3$.]



9. The area of a triangle is 20 cm^2 , and the altitude is 4 cm greater than the base. Find the length of the base, to the nearest millimetre.



10. The sum of the squares of two consecutive integers is 365. Find the integers.
11. A rectangle has perimeter 23 cm. Its area is 33 cm^2 . Determine the dimensions of the rectangle. Include a diagram in your solution.
12. A rectangular construction site is enclosed on three sides using 1200 m of fencing. The remaining side is formed by an existing wall. What dimensions enclose $180\,000 \text{ m}^2$ of land?



13. The three sides of a right triangle are consecutive even integers. What is the length of each side?
14. A ladder is 6 m long. If the height of the top of the ladder must be no greater than 10 times the distance from the base to the wall, how high up a wall can the top of the ladder be placed? Include a diagram in your solution. Round to the nearest millimetre.
15. A science experiment involves launching a small rocket. The following measurements are taken:
Initial height: 0.61 m
Initial vertical velocity: 36.85 m/s
- Create a quadratic model for the height, in metres, of the rocket after a given number of seconds.
 - Verify the following results of the experiment:
Total time in the air: 7.54 s
Maximum height: 69.89 m
 - Sketch a graph of this relation and label the key information as in Example 1 of this section.
16. The acceleration due to gravity on Earth is 9.8 m/s^2 . A ball is thrown upward at an initial velocity of 15 m/s from a height of 1 m above the ground. Round answers to the nearest tenth.
- Write an equation for the height of the ball.
 - What is the height of the ball after 1 s?
 - After how many seconds does the ball land?
 - What is the maximum height of the ball? When does this occur?
 - Repeat parts a) to d) for a ball thrown on the Moon, where $g = 1.62 \text{ m/s}^2$.
 - Repeat parts a) to d) for a ball thrown on Jupiter, where $g = 23.1 \text{ m/s}^2$.
17. Sherri sells photos of athletes to baseball, basketball, and hockey fans after their games. Her regular price is \$10 per photograph, and she usually sells about 30 photographs. Sherri finds that, for each reduction in price of \$0.50, she can sell an additional two photographs.
- Total sales revenue is the product of the number of units sold and the price. Make an algebraic model to represent Sherri's total sales revenue.
 - At what price will Sherri's revenue be \$150?
 - At what price will her maximum revenue occur?
 - At what price will her revenue be \$0?
 - Graph the relationship between revenue and the number of price reductions. Which features on the graph represent the solutions to parts b), c), and d)?
18. A rectangular picture frame measures 20 cm by 30 cm. A new frame is to be made by increasing each side length by the same amount. The resulting enclosed area is to be 1064 cm^2 . Find the dimensions of the new picture frame. Include a diagram in your solution.
19. A rectangular garden measures 15 m by 24 m. A larger garden is to be made by increasing each side length by the same amount. The resulting area is to be 1.5 times the original area. Find the dimensions of the new garden, to the nearest tenth of a metre. Include a diagram in your solution.
20. The length of a rectangular field is 2 m greater than three times its width. The area of the field is 1496 m^2 . What are the dimensions of the field?